

## List of Questions and Answers for PET and Polystyrene Sources

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Requirements for PET and Polystyrene sources are found in 63.1316

### **So I make PET, what emission limits do need to comply with? 63.1316**

If you make PET using a batch process comply with the batch process vent requirements.

Otherwise comply with the continuous requirements for your specific process.

You are no longer required to comply with requirements in NSPS Subpart DDD and compliance can be determined by organic HAP or TOC.

### **I manufacture PET using a continuous dimethyl terephthalate process what are my emission control requirements? [63.1316(b)(1)]**

If you are an existing affected source with organic HAP emissions greater than 0.12 kg organic HAP/ Mg of product from continuous process vents in the material recovery sections can comply by one of the following:

- 1) Organic HAP emissions in each individual material recovery section can be no greater

than 0.018 kg organic HAP/Mg of product from the associated TPPU; or the organic HAP emissions from all continuous process vents in the collection of material recovery sections shall, as a whole be no greater than 0.018k kg organic HAP/ Mg of product from all associated TPPUs.

- 2) Maintain the daily average outlet gas stream temperature from each final condenser in a material recovery section at a temperature of 3C (37 F) or colder.
- 3) Comply with one of the following:
  - A) Reduce the emissions in a combustion device to achieve 98 wt% reduction or achieve a concentration of 20 ppmv on a dry basis, whichever is less stringent. If you chose to comply with the 20 ppmv options, correct to 3% oxygen if supplemental combustion air is used.
  - B) Combust the emissions in a boiler or process heater with a input capacity of 150 million BTU/hr or greater by introducing the emissions into the flame zone of the boiler or process heater.
  - C) Combust the emissions in a flare that complies with 63.1333 (e).

You must also limit organic HAP emissions from continuous process vents in the collection of polymerization reaction sections by comply with one of the following options:

- 1) Organic HAP emissions from all continuous process vents in each individual polymerization reaction section (including emission from any equipment used to recover ethylene glycol, but excluding emissions from the process contact cooling towers) shall as a whole, be no greater than 0.02 kg organic HAP/Mg of product from the associated TPPU, or organic HAP emissions from all continuous process vents within the affected source shall as a whole, be no greater than 0.02 kg organic HAP per MG product from all associate TPPU(s).
- 2) Comply with one of the following:
  - A) Reduce the emissions in a combustion device to achieve 98 wt% reduction or achieve a concentration of 20 ppmv on a dry basis, whichever is less stringent. If you chose to comply with the 20 ppmv options, correct to 3% oxygen if supplemental combustion air is used.
  - B) Combust the emissions in a boiler or process heater with a input capacity of 150 million BTU/hr or greater by introducing the emissions into the flame zone of the boiler or process heater.
  - C) Combust the emissions in a flare that complies with 63.1333 (e).

Continuous process vents that are not included in a material recovery section and not included

in a polymerization reaction section, should comply with the requirements in the continuous process vent section. (Please see other section in tool).

**I manufacture PET using a continuous terephthalic acid process what are my emission control requirements? [63.1316(b)(2)]**

Limit organic HAP emissions from continuous process vents in the collection of raw material preparation by one of the following options.

- 1) Continuous process vents associated with the esterification vessel in each individual raw material preparation section shall, as a whole, be no greater than 0.04 kg organic HAP per Mg of product from the associated TPPU, or be no greater than 0.04 kg organic HAP per Mg of product from all raw material sections in the associated TPPU's. Other continuous process vents (not associated with the esterification vessels) in the raw material preparation should comply with the continuous process vent section (Please see other section in tool).
- 2) Comply with one of the following:
  - A) Reduce the emissions in a combustion device to achieve 98 wt% reduction or achieve a concentration of 20 ppmv on a dry basis, whichever is less stringent. If you chose to comply with the 20 ppmv options, correct to 3% oxygen if supplemental combustion air is used.
  - B) Combust the emissions in a boiler or process heater with a input capacity of 150 million BTU/hr or greater by introducing the emissions into the flame zone of the boiler or process heater.
  - C) Combust the emissions in a flare that complies with 63.1333 (e).

Limit organic HAP emissions from continuous process vents in the collection of polymerization reaction section within the affected source by complying with one of the following options.

- 1) Organic HAP emissions from each polymerization reaction section (including emissions from any equipment used to further recover ethylene glycol but excluding emissions from process cooling towers) shall as a whole, be no greater than 0.02 kg/Mg product from the associate TPPU, or no greater than 0.02 kg/Mg product from all polymerization reaction sections in the associated TPPUs.
- 2) Comply with one of the following:
  - A) Reduce the emissions in a combustion device to achieve 98 wt% reduction or achieve a concentration of 20 ppmv on a dry basis, whichever is less stringent. If you chose to comply with the 20 ppmv options, correct to 3% oxygen if supplemental combustion air is used.

- B) Combust the emissions in a boiler or process heater with a input capacity of 150 million BTU/hr or greater by introducing the emissions into the flame zone of the boiler or process heater.
- C) Combust the emissions in a flare that complies with 63.1333 (e).

Continuous process vents not included in a raw materials preparation section and not included a polymerization reaction section should comply with the continuous process vent section.

**I manufacture polystyrene using a continuous process what are my emission control requirements? [63.1316(c)(1) thru (3)]**

You are no longer required to comply with requirements in NSPS Subpart DDD. Compliance can be determined using organic HAP or TOC.

Limit organic HAP emissions from continuous process vents in the material recovery section by complying with one of the following three options:

- 1) Organic HAP emissions shall be no greater than 0.0036 kg organic HAP per Mg of product for each continuous process vent from the associated TPPU, or alternatively, no greater than 0.0036 kg organic HAP per Mg of product from all the continuous process vents in the associated TPPU.
- 2) Maintain the daily average outlet gas stream temperature from each final condenser in a material recovery section at at temperature of -25 C (-13F) or colder.
- 3) Comply with one of the following:
  - A) Reduce the emissions in a combustion device to achieve 98 wt% reduction or achieve a concentration of 20 ppmv on a dry basis, whichever is less stringent. If you chose to comply with the 20 ppmv options, correct to 3% oxygen if supplemental combustion air is used.
  - B) Combust the emissions in a boiler or process heater with a input capacity of 150 million BTU/hr or greater by introducing the emissions into the flame zone of the boiler or process heater.
  - C) Combust the emissions in a flare that complies with 63.1333 (e).

Limit organic HAP emissions from continuous process vents not included in a material recovery section by comply with the continuous process vents section (please see other portion of this tool).

**What are my monitoring requirements for PET and polystyrene affected sources? [63.1317]**

If you use a control or recovery device, please comply with the monitoring provisions for that control or recovery device found in the continuous process vents. See below.

Control Device	Monitoring Device	Comments
Incinerator	temperature monitoring device with continuous recorder	For any Incinerator other than a catalytic incinerator the temperature monitoring device shall be installed in the fire box or in the duct work immediately downstream of the fire box in a positions before any substantial heat exchange occurs.
Catalytic Incinerator	temperature monitoring device with continuous recorder	Temperature monitoring device shall be installed in the gas stream immediately before and after the catalyst bed.
Flare	Device capable of continuously detecting the presence of a pilot flame is required.	Examples of some devices include: thermocouple, ultra-violet beam sensor, or infrared sensor
Boiler or process heater less than 44 MW design heat input capacity	Temperature monitoring device in firebox equipped with a continuous recorder is required	Any boiler or process heater in which all vent streams are introduced with the primary fuel or are used as the primary fuel is exempt from this requirement.

Control Device	Monitoring Device	Comments
Scrubber used with incinerator, boiler, or process heater in concert with the combustion of halogenated batch process vents or halogenated aggregate batch vent streams	<p>1) pH monitor equipped with a continuous recorder to monitor the pH of scrubber effluent.</p> <p>2) A flow measurement device equipped with a continuous recorder located at the scrubber influent for liquid flow.</p>	<p>Gas stream flow shall be determined using one of the following procedures.</p> <p>a) using the design blower capacity with appropriate adjustment for pressure drop.</p> <p>b) if subject to 40 C.F.R. 264-266 that have required determination for liquid to gas ratio prior to applicable compliance date for this subpart, the owner or operator may determine gas stream flow by the method that had been utilized to comply with 264-266. A determination that was conducted prior to the compliance date for this subpart may be used to comply if it is still representative.</p>
Scrubber used with incinerator, boiler, or process heater in concert with the combustion of halogenated batch process vents or halogenated aggregate batch vent streams (cont.)		<p>c) prepare and implement a gas stream flow determination plan. Must include a plan that provides the value for representative gas stream flow or highest gas stream flow anticipated. Must include Methodology to be followed and why it will reliably determine the gas stream flow, and a description of the records that will be maintained to document the determination of gas stream flow. The owner or operator shall maintain the plan as specified in 63.1335 (a)</p>

Control Device	Monitoring Device	Comments
Absorber	<p>1) a scrubbing liquid temperature monitoring device; and</p> <p>2) a specific gravity monitor device, each with a continuous recorder.</p>	
Condenser	Condenser exit temperature (product side) monitor device equipped with a continuous recorder.	
Carbon Absorber	<p>1) an integrating regeneration steam flow or nitrogen flow; or</p> <p>2) pressure monitoring device having an accuracy of +/- 10% percent of flow rate level, or pressure, or better, capable of recording the total regeneration steam flow or nitrogen flow, or pressure (gauge or absolute) for each regeneration cycle;</p> <p>Must also have a carbon bed temperature monitoring device, capable of recording the carbon temperature after each regeneration and within 15 minutes of completing any cooling cycle is required.</p>	
Alternative Control or Monitoring	<p>Required if uses a combustion device other than a incinerator, boiler, process heater or flare.</p> <p>Or uses one of the combustion or recovery or recapture device but seeks to monitor a parameter other than those listed.</p>	Must submit a request according to procedures in 63.1327 (f) and 63.1335 (f).

**What are my source testing requirements and compliance demonstration provisions? [63.1318]**

Processes with continuous process vents using a control or recovery device shall comply with the same testing and compliance provisions for continuous process vents. Please see the other section of the tool for assistance.

The following determinations are not subject to the requirements in the continuous process vent sections.

*PET Affected sources using a Dimethyl Terephthalate Process.*

Equations are found in section 63.1318. Test methods used to gather data for the equations are in the following table. Estimate to determine the kg of Organic HAP per Mg of product.

Test Method 40 C.F.R. Part 60 Appendix A (unless noted otherwise)	Purpose	Comments
Method 1 or 1A	Flow measurement using pitot tube.	References to particulate matter do not apply. No traverse necessary if Method 2A or 2D is used to determine gas stream volumetric flow rate.
Method 2, 2A, 2C or 2D	Volumetric Flow Rate	If vent stream passes through a final steam jet ejector and is not condenses, correct to 2.3% moisture.



<b>Test Method</b> 40 C.F.R. Part 60 Appendix A (unless noted otherwise)	<b>Purpose</b>	<b>Comments</b>
Method 18 or Method 25A	Determine the concentration of organic HAP or TOC, as appropriate.	<p>Other methods or data can be used if validated according to Method 301 in appendix A of 40 C.F.R. Part 63.</p> <p>Calibration gas for Method 25A should be the single organic HAP representing the largest percent by volume of the emissions.</p> <p>Using Method 25A is acceptable if the response factor from the high level calibration gas is at least 20 times the standard deviation of the response from the zero calibration gas when instrument is on most sensitive scale.</p>

You can use engineering estimates if you find that the mass emission rate kg per Mg of product is less than 0.07 kg organic HAP/ Mg product.

*Compliance with Mass Emission per Mass Product Standards:*

Follow the same procedures in 63.1318(b)(1) and same test methods as above however no engineering estimate allowance has been made.

*Compliance with Temperature Limits for Final Condensers:*

Demonstrate continuous compliance based on an average exit temperature determined for each operating day. The calculations should comply with the following provision. [63.1335(d)(3)]

-The daily average value should be calculated as the average of all parameter values recorded during the operating day. The operating day shall be the period the owner or operator specified in the Notification of the Compliance status. However if the average is within limits the owner or operator can just record that it is above the minimum level or below the maximum level, and records should be kept of the times and durations when the monitors are not operating.

**What are my recordkeeping requirements? (63.1319)**

If you are using a control or recovery device, you should comply with the recordkeeping provisions for that device as found in the continuous process vents section. (See other section in tool)

To determine compliance with the applicability procedures for PET affected sources using Dimethyl Terephthalate Process, by demonstrating that the mass emission per mass product are less than or equal to 0.12 kg organic HAP per Mg of product, keep the following records.

- 1) Results of the mass emission per mass product calculation.
- 2) Records of any changes in process operation that increases the mass emission per mass product.

Keep the following records to demonstrate compliance with the temperature limits for final condensers. Keep records of the daily averages. If the average is within limits the owner or operator can just record that it is above the minimum level or below the maximum level, and records should be kept of the times and durations when the monitors are not operating.

**What are my reporting provisions? [63.1320]**

If you are using a control or recovery device, you should comply with the reporting provisions for that device as found in the continuous process vents section. (See other section in tool)

If you are comply by having less than or equal to 0.12 kg organic HAP/ Mg of product for PET production using dimethyl terephthalate process. Include records of any changes in process operation that increases the mass emission per mass product each periodic report. Include the results of the mass emission per mass product calculation in the Notification of Compliance Status. If any process change is made that increases the mass emission rate to greater than 0.12 kg organic HAP/Mg product, the owner shall submit a report within 180 days after the process change is made or when the information regarding the change is known. The report can also be made with the next periodic report. The report should contain a description of the process change and the newly calculated mass emission rate.